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ABSTRACT

Maintaining that much of the prevailing public discussion and media "hype" surrounding gender issues in education amount to little more than anecdotal rhetoric and opinion, this paper examines evidence for sex differences in the experiences and outcomes of schooling from recent and emerging teacher and school effectiveness research. The paper focuses on five areas: (1) the differential schooling performances and experiences of boys and girls throughout their primary and secondary schooling in terms of academic outcomes, attitudes, and behaviors; (2) key reasons for these differences and their implications for policy and practice; (3) identification of the major sources of variation in students' achievement; (4) barriers to reform; and (5) suggested strategies for supporting the learning needs of boys. Research cited suggests that on average, boys' literacy skills, general academic achievements, attitudes, behaviors, and experiences of schooling are significantly poorer than those of girls. However, the paper argues, these differential gender effects pale into relative insignificance compared with class or teacher effects. The paper maintains that the quality of teaching and learning provision with major emphases on literacy and related verbal learning, reasoning, and written communication skills are by far the most salient influences on students' cognitive, affective, behavioral, and experiential outcomes of schools, regardless of gender. Contains 118 references. (KB)

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'Problems' in the Education of Boys and Exploring 'Real' Effects From Evidence-Based Research: Useful Findings in Teaching and Learning for Boys and Girls

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Background paper of keynote address presented at the
Teaching Boys Developing Fine Men Conference
Carlton Crest Hotel, Brisbane, August 21-22, 2000

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Abstract: Unfortunately, much of the prevailing public discussion and media 'hype' surrounding gender issues in education – especially differences in girls' and boys' experiences and outcomes of schooling – amount to little more than anecdotal rhetoric and opinion. Indeed, a good deal of this discussion is not supported by findings from evidence-based research. In this paper, and against the background of an invited submission to Dr Brendon Nelson's parliamentary *Inquiry Into the Education of Boys*, evidence highlighting **'real'** effects from recent and emerging teacher and school effectiveness research is presented and discussed. For example, whereas on average, boys' literacy skills, general academic achievements, attitudes, behaviors and experiences of schooling are significantly poorer than those of girls, **these differential gender effects pale into relative insignificance compared with class/teacher effects**. That is, the quality of teaching and learning provision with major emphases on ***literacy*** and related ***verbal reasoning and written communication skills*** are by far the most salient influences on students' cognitive, affective, behavioral and experiential outcomes of schooling – regardless of gender. That is, **teachers and their professional development make a difference**!

Introductory Rationale

Issues related to *'problems' in the education of boys* have considerable international and local currency. In Australia, such issues have been brought into sharper focus in response to the recent call for submissions to the federal government's *Inquiry Into the Education of Boys* by the Australian House of Representatives Standing Committee on Employment, Education and Workplace Relations – chaired by Dr Brendon Nelson, MP. At the center of these issues are concerns about the relative underachievement of boys (compared with girls) and their poorer attitudes, behaviors and experiences of schooling. Unfortunately, however, much of the public discussion of the related issues, and the media 'hype' that surrounds it, are replete with 'myth', anecdote, opinion and uninformed comment that have little basis in findings from recent and emerging research. Even a cursory inspection of the offerings submitted to date suggest that such is the case.[2] This is not to deny either the legitimacy and utility of such offerings, but in the absence substantive, research-based evidence to support the Committees' deliberations, their task is a particularly difficult one.

By drawing on key findings from the existing and emerging research in this area, the present paper is an attempt to provide evidential support to assist the Committee in its deliberations. At this point, a reiteration of the inquiry's stated *Focus* (or 'terms of reference') is helpful.

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[1] This paper is an expanded version of a written submission to the parliamentary *Inquiry Into the Education of Boys* by Rowe and Rowe (2000a). Note that the views expressed here are those of the author and are not necessarily those held officially by the Australian Council for Educational Research.

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[2] During the course of the *Inquiry*, submissions are available on the Committee's internet web site at: http://www.aph.gov.au/house/committee/eewr

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Focus of the Inquiry

In letters of invitation to make submissions to the *Inquiry* (dated 25 May 2000), the *Focus* is expressed as follows:

> The Minister for Education, Training and Youth Affairs, the Hon Dr David Kemp, MP, has requested the House of Representatives Standing Committee on Employment, Education and Workplace Relations to inquire and report on:
>
> **The social, cultural and educational factors affecting the education of boys in Australian schools, particularly in relation to their literacy needs and socialization skills in the early and middle years of schooling, and**
>
> **the strategies which schools have adopted to help address these factors, those strategies which have been successful and scope for their broader implementation or increased effectiveness.**

What follows is an expanded version of the submission made by Rowe and Rowe (2000a).

Focus of the present submission

On the basis of our research and clinical experience that spans the past 25 years, we respectfully submit that the *Focus of the Inquiry* as stated in the submission request and reiterated above, is largely misplaced. The reasons for this are explicated in what follows. In outline, the present submission focuses on:

- The differential schooling performances and experiences of boys and girls throughout their primary and secondary schooling in terms of: academic outcomes, attitudes and behaviors;
- Key reasons for these differences and their implications for policy and practice;
- Identifying the major sources of variation in students' achievements;
- Barriers to reform; and
- Suggested strategies for supporting the learning needs of boys.

Since most of the empirical evidence in support of the findings summarized here is already published, the source references are given for the related technical detail. In the case of yet to be published evidence, illustrative graphical presentations of the relevant data are provided.

Differential schooling performances and experiences of boys and girls

The evidence indicating that boys, on average, achieve at significantly lower levels than girls on ALL areas of the assessed *cognitive* curriculum throughout their primary and secondary schooling is not in dispute. Moreover, this evidence is universal (Arnold, 1997, Carvel, 1997, Collins *et al.*, 2000; Dean, 1998; Masters & Forster, 1997a,b; Millard, 1997; Rowe, 2000a,b; Sukhnamdan *et al.*, 2000). Indeed, there is a widening gap between the academic performances of girls and boys here in Australia, as well as in English speaking countries world-wide (Ainley, 1999; Buckingham, 2000; Cassidy, 1999; DETYA, 2000; MacCann, 1995; MacDonald, 1999; McGaw, 1996; West, 1999). Furthermore, compared with girls, findings from the emerging evidence-based research consistently indicates:

- Boys are significantly more 'disengaged' with schooling and more likely to be at 'risk' of academic underachievement – **especially in *literacy*** (Bowne & Fletcher, 1995; Epstein *et al.*, 1998; Fletcher *et al.*, 1999; Hinshaw, 1992a,b; Irvine, 1992, 1999; MacDonald *et al.*, 1999; McGee *et al.*, 1988; McGee & Share, 1988; Rowe, 1997, 1998, 1999a);
- Boys exhibit significantly greater externalizing behavior problems in the classroom and at home (i.e., *anti-social, inattention, restlessness* – particularly *inattention* (Barkley, 1996; Collins *et al.*, 1996; Hill & Rowe, 1996; 1998; Hill *et al.*, 1996a,b; Hinshaw, 1992a,b, 1994; Rowe, 1991; Rowe & Hill, 1998; Rowe & Rowe, 1992a,b, 1997a,b, 1998, 1999);
- Fifty per cent of consultations to pediatricians at tertiary referral hospitals relate to *behavioral problems*, including *Attention-Deficit Disorder* (ADD) and *Attention-Deficit/*

Hyperactivity Disorder (AD/HD), with a ratio of boys 9: girls 1. Further, 20% of referrals relate to *learning difficulties* – being made up of predominantly boys demonstrating ***poor achievement progress in literacy*** (Rowe & Rowe, 2000b);

- In the early years of schooling, boys constitute between 75-85% of those children (usually in Grades 1 or 2) identified 'at-risk' of ***poor achievement progress in literacy***, and selected for participation in a *Reading Recovery* intervention program (Rowe, 1999a, 2000c).
- Boys have a higher prevalence of *auditory processing problems*. Unless appropriate classroom management strategies are put in place, these problems impact negatively on their early literacy achievement and subsequent progress, as well as their behaviors (Rowe, Pollard, Tan & Rowe, 2000; Rowe & Rowe, 2000b);
- Boys report significantly less positive experiences of schooling in terms of *enjoyment of school*, perceived *curriculum usefulness* and *teacher responsiveness* (Hill *et al.*, 1996a,b; MacDonald *et al.*, 1999; Rowe & Hill, 1998; Rowe & Rowe, 1999);
- Boys are more likely to 'drop out' of schooling prematurely. Recent Australian national estimates indicate that between 1994 and 1998, 30% of boys failed to complete their secondary schooling (cf. 20% girls – Marks *et al.*, 2000). This results in reduced employment opportunities and general quality of life chances; and
- Comorbid with underachievement, boys are subject to more disciplinary actions during schooling (including bullying behaviors and expulsions), are more likely to participate in subsequent delinquent behaviors, alcohol and substance abuse, and during adolescence, are 4-5 times more likely than girls to suffer from depression and commit suicide (Buckingham, 2000; Collins *et al.*, 1996; Mitchell, 2000; Zubrick *et al.*, 1997).

Listening to the 'voices'

In addition to the empirical data reported in the studies and references cited above, comprehensive interview data have been collected from both students and teachers. A brief selection of these is sufficient to illustrate the consistency of sentiment that is experienced by students and teachers. For example, the following response from an articulate 13 year-old boy illustrates the dilemma faced by many boys and their teachers:

> My English teacher wants me to write about my ***feelings***, my History teacher wants me to give my ***opinions***, and my Science teacher wants me write on my ***views*** about the environment! I don't know what my ***feelings***, ***opinions*** and ***views*** are, and I can't write about them. Anyway, they're none of their bloody business! I hate school!! I only wish I could write about the things I'm interested in like sport and military aircraft.

Another response from a 15 year-old boy:

> This is girl stuff! This school is **run** by girls **for** girls. I can't wait to get out!

From a girl in a Year 10 all-girls Maths class:

> It's **great** not being with the boys. We can talk with each other about what we're doing and ask questions of the teacher without being put down by the boys.

A response from a Year 11 boy about his Geography class and teacher:

> There's just bits of it that sink in, but most of it doesn't really register. You just kind of half listen and half not listen. She raves-on and you switch on only sometimes just in case she asks you a question, but her voice is always there.

A comment by a female Year 9 Coordinator in a large coeducation secondary college illustrates a further dilemma faced by boys and their teachers:

> I'm really worried about the boys at this Year level – the girls give them a very hard time. The 'sisterhood' are bitchy, socially and sexually aggressive, and nastily intolerant of the boys' less competent verbal and academic skills. I'm having real difficulties dealing with the problem.

Key reasons for differential performance

Before outlining what we consider to be key reasons underlying the available and emerging research-based evidence accounting for the differential schooling performances and experiences of boys and girls, it is important to locate this evidence in context.

Over the last 25 years there has been a notable shift in the pattern of educational performance on monitoring-type achievement tests and on public examinations, to girls outperforming boys on all areas of the assessed curriculum (Arnot *et al.*, 1998; Buckingham, 2000; Gallagher, 1997; Rowe, 2000a; Warrington & Younger, 1996). Consistent with international trends, this shift has been particularly marked over the last decade in Australia (MacCann, 1995; McGaw, 1996; Rowe & Hill, 1996; Rowe, Turner & Lane, 1999, 2000; Teese *et al.*, 1995; West, 1999). For example, in his review of the New South Wales HSC, McGaw (1996, p. 108) notes:

> In 1991, males were over-represented at the top and bottom of the Tertiary Entrance Ranks, while females were over-represented in the middle ranges.
>
> By 1995, the position had changed markedly... Females are now over-represented in all the high Tertiary Entrance Rank ranges, and males are even more over-represented at the bottom.

Similarly, the gender effect in favor of females on achieved subject scores in the *Victorian Certificate of Education* (VCE) between 1994 and 1999 had an average magnitude of +0.26 standard deviation units per subject (Rowe, 1999b, Rowe, Turner & Lane, 1999, 2000). Since the inappropriate publication of 'league-table'-type rankings of schools' Year 12 results in major daily newspapers in several Australian states (see ACT, 2000a; Rowe, 1996, 2000d), senior staff of coeducational secondary schools have been acutely aware that their school average 'results' are "...dependent on the relative size of the female/male enrolments in a given year's cohort..." (Rowe, 1999b, p. 14). This superior performance of girls is further underscored by the differential effects of gender/class/school groupings on students' 'ability'-adjusted mean scores for 53 VCE studies – as shown in Figure 1.

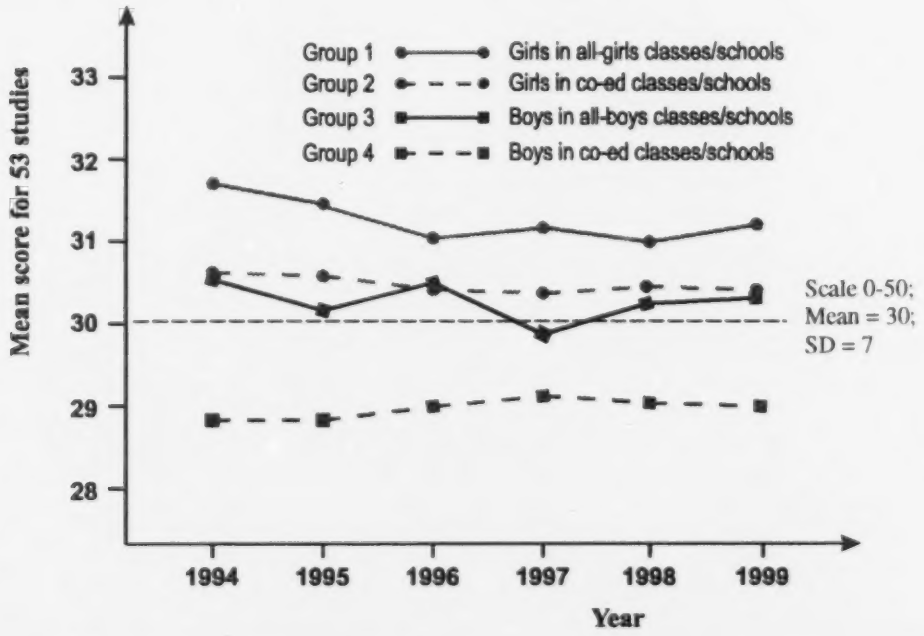

Figure 1. Plot of mean 'ability-adjusted' VCE scores for 4 gender/school/class groupings of students on 20 studies with the largest enrolments (1994-1999)

[N ≡ 270,000 students drawn from 600 VCE providers; from Rowe, 2000f.]

Additional analyses of the data summarized in Figure 1 indicated that for those students taking 5 studies, females in all-female classes/schools achieved an average of 11.5 score points more

than their male counterparts in coeducational settings, yielding a mean difference of > 20 percentile TER or ENTER ranks.[3]

Against the background of this evidence, several former all-boys schools in Victoria have chosen to become co-educational, whereas some coeducational schools have adopted single-sex class groupings. However, **it is important not to over-interpret the 'importance' of these gender and gender/class/school-grouping effects, since they pale into insignificance compared with class/teacher effects – regardless of student gender** (see below). Nonetheless, in commenting on McGaw's (1996) findings cited above, West (1999, p. 41) exclaims:

> Nobody seems to be able to explain satisfactorily what happened from 1990 onwards to assist girls, on average, to do better than boys and improve this performance year after year, nor why boys have begun to do so poorly, relative to girls.

The importance of *literacy* and particularly, *verbal reasoning* and *written communication* skills

In response to West, a key reason for the observed gender differences in performance, attitudes and behaviors, we argue, is that since the early 1990's there has been a notable increase in the demand for higher levels of operational **literacy** and especially, **verbal reasoning and written communication skills** in school education – areas in which girls, on average, have distinct maturational and socialization advantages (Hill & Rowe, 1998; MacDonald *et al.*, 1999; Rowe, 1999c,d; 2000a; Rowe & Rowe, 1999). This demand is reflected in curriculum design and content, as well as the way it is taught and assessed – at all stages of primary and secondary schooling. It is evident in school-based assessment and standardized, statewide testing in the early and middle years of schooling, as well as in certifying examination programs at Year 12. For example, MacDonald *et al.* (1999) observe: "...recent changes in curricular design and assessment practices tend to favor the traditional strengths of girls" (p. 17).

The case of changes to mathematics curriculum and its assessment since the early 1990's is illustrative. Due to shifts in pedagogical emphasis from ***math*** to ***numeracy*** by mathematics educators, the demand for verbal reasoning and written communication skills continues to be a feature of curricula content and assessment in mathematics. For Year 12 *4-Unit Mathematics* in NSW or *Specialist Mathematics* in Victoria, for example, there is a requirement for students to demonstrate extremely high levels of such skills. That is, the verbally presented, 'in-context' problems require to be read, understood, translated into relevant algorithms, solved, then explained and justified. Such a process requires extraordinarily sophisticated levels of both verbal reasoning and written communication skills – more ably handled by girls. Indeed, from Kindergarten to Year 12, girls on average, consistently outperform their male counterparts in literacy, numeracy, and in all other academic curriculum areas.

Consistent with a growing body of research, findings from a large-scale longitudinal study of factors affecting students' achievement progress indicated large differences between male and female students on all key factors affecting their learning outcomes (see Hill & Rowe, 1996, 1998; Hill *et al.*, 1996a,b; Rowe & Hill, 1996, 1998). That is, girls indicated significantly higher levels of achievement and rates of progress than males (and demonstrated more *attentive behaviors* in the classroom). To illustrate this, Figure 2 summarizes both the cross-sectional and longitudinal data for the achievement levels of boys and girls in each of Years K to 11 on the *Reading* strand of the Victorian *English Profiles* (Victoria, 1991) in the form of 'box-and-whisker' plots – used to describe the 'shape' of the distributions for each Year Level.

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[3] It should be noted that an important positive predictor of higher average VCE scores by females for English and for all other VCE subjects was their significantly higher scores on the *Written Communication* component of the *General Achievement Test* (GAT). Detailed accounts describing the use of the GAT in moderating students' school-based common assessment tasks (CATs) in the VCE, are provided by: Hill, Brown, Rowe and Turner (1997), Hill and Rowe (1995), Rowe, Turner and Lane (1999, 2000), and by Turner (1998).

The 'boxes' in Figure 2 ('open' for males and 'shaded' for females) describe the range of achievement of the 'middle' 50 per cent of students at those Year levels. The top of each 'box' indicates the level of students achieving at the 75th percentile, the bottom of the 'box' shows the 25th percentile and the asterisk indicates the 50th percentile, or *median* value. The top and bottom 'whiskers' show the 90th and 10th percentile levels of achievement respectively.

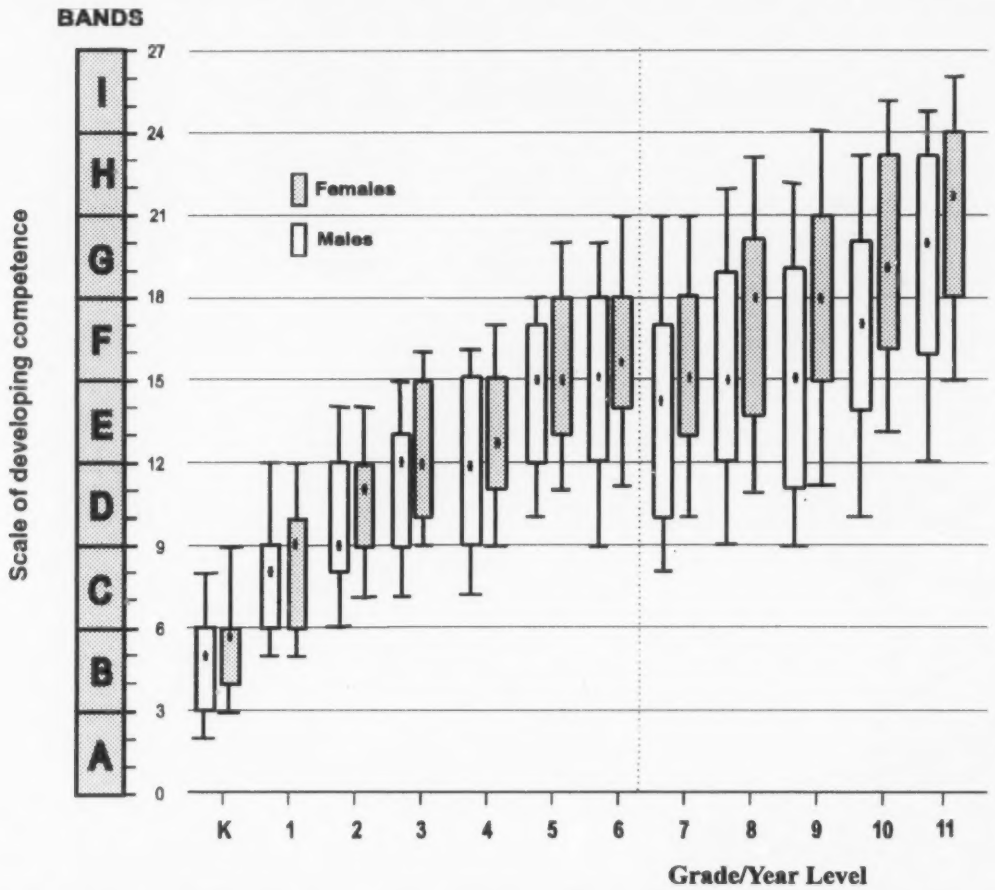

Figure 2. Box plots showing distributions for male and female students' progress on the *English Profiles - Reading Strand*, by Grade/Year Level (n = 13,700)
From Rowe and Hill (1996, p. 335)

The distributions shown in Figure 2 for the *Reading* strand indicate a period of rapid growth in both girls' and boys' achievements during the first few years of schooling, coinciding with the period during which students acquire basic skills, and thereafter show a consistent rate of growth to Year 9. In addition to the marked gender differences in achievement, it is noticeable that the range of achievement increases markedly over the years of schooling, with more than four band widths separating Year 9 students at the 10th and 90th percentiles.

Figure 2 also provides evidence of a discontinuity between primary and secondary schooling for *Reading* achievement, with a 'dip' in the rate of progress of students in the first year of secondary school (Year 7). This pattern has been observed in several studies using common measures over primary and secondary schooling (e.g., Elly, 1992; Lunberg & Linnakylä, 1993; Purves, 1973). An interesting feature of this pattern is its striking similarity with that shown by pediatric percentile growth-charts for height and weight during the pre-pubertal to early adolescent period of development. In commenting on this phenomenon Rowe (1995) notes: "It is possible that what has become known as an 'educational phenomenon' [i.e. 'apparent dips' in

literacy performance during the transition from primary to secondary schooling] may also have developmental psycho-physiological correlates" (p. 78).

Of particular concern is the flattening out of the 'growth trajectory' at the 10th percentile (particularly for boys), indicating a trend of less than one '*band* width' of growth from Year 4 to Year 9. Note also, the minimal growth between Years 9 and 10 – especially for boys. It should be noted that while similar findings applied to the two additional measures of Literacy in this study (namely, the *Writing* and *Spoken Language* strands), both the higher achievement levels and rate of growth indicated by girls compared with boys were even more evident on these two strands.

In reporting key findings from this study in terms of students' achievement progress in ***literacy***, Hill and Rowe (1998, pp. 326-327) note:

> Of the predictors of student ***Literacy Achievement***, the most salient was students' attentiveness in the classroom. By far the major proportion of the variance in student ***Attentiveness*** was found to be at the student-level and the most influential predictor of ***Attentiveness*** was ***Gender***, with female students being significantly more attentive than male students. Whereas the higher attentiveness levels of girls is familiar to most teachers, the implications for literacy curriculum and its assessment may not always be recognized.
>
> In recent years, there has been a greater emphasis within Australian elementary schools, both in approaches to teaching and learning and to assessment of student achievement, on activities that require high levels of sustained attention. Such activities include on-task-demanding behaviors such as the production of written portfolios, the writing of extended pieces of prose, and the completion of written research projects. There has been a corresponding move away from short answer and 'check the box' type activities to tasks requiring increasingly higher levels of verbal reasoning skills – activities in which girls have a well-established achievement and maturational advantage. It is possible that these changes in pedagogy may have placed, albeit inadvertently, a greater premium on ***attentiveness*** that have contributed to the phenomenon of substantial gender differences in students' literacy progress, mediated especially through ***Attentiveness*** (see Rowe, 1991; Rowe & Rowe, 1992b).

More recently, in a report of key findings from the 1998 statewide Literacy and Numeracy Assessment Program for Year 3 and Year 7 students in Tasmanian schools, Rowe (1999c, p. 39) makes the following summary comments:

> Given the limitations of the 'one-off', cross-sectional nature of the present data, the implications of the findings in terms of both policy and practice, are clear. In addition to the annotations noted in the body of the analyses presented above, the following comments are noteworthy.
>
> At the **student-level** (regardless of students' background or 'intake' characteristics), it is **vital** that teaching and learning priorities be focussed on the development of individual students' ***Literacy*** skills and achievements – especially in **reading** (READ) – since reading (albeit mediated by ***inattentiveness*** – INATTEN) is the foundation competency that has the dominant effect on **all** other literacy and numeracy achievements. Moreover, the development of number skills and ***working numerately*** (WRKNUM) underlies all other numeracy competencies. Note also the strong reciprocal effects between READ and INATTEN, suggesting the importance of reading competency in reducing the negative effects of inattentiveness.
>
> As already noted for the comparable Year 3 findings, it is important to emphasize that the 1998 Year 7 numeracy test items all had excessive requirements for high levels of verbal reasoning skills. As such, the composite constructs of ***Literacy*** and ***Numeracy*** are confounded – as evidenced by the strong positive correlation between the two variables ($r = 0.607$; see Fig. 1, p. 6). In such circumstances, it is vital that invalid inferences are **not** made about students' levels of achievement in ***mathematics*** (per se). Whereas the postmodern 'information society' is requiring increasingly higher levels of verbal reasoning 'abilities' (VRA) of persons in the workplace and in educational settings, there is a danger of over-emphasizing VRA to the detriment of developing equally important non-verbal reasoning skills – especially in educational performance assessment and monitoring. As recommended previously, to minimize this problem in future monitoring projects, it is recommended that numeracy test items in each domain be included that place minimal demands on students' verbal reasoning 'abilities' and skills. Such items are typically presented in simple symbolic or algorithmic forms.

> In respect of students' ***inattentive*** behaviors in the classroom, we know from large-scale, longitudinal research that students' early growth in reading skills have a strong and enduring effect on reducing their current and subsequent inattentive behaviors, and have positive impacts on their achievements in cognitive areas of the curriculum, as well as in affective and behavioral domains. The findings related to analyses of the Year 7 data have provided strong support for this proposition.

In brief, the research evidence suggests that throughout the entire duration of their schooling for a large proportion of boys, the verbal reasoning requirements and general literacy demands of school curricula and assessment are beyond both their developmental capacity and normative socialization experiences to cope successfully. Bray *et al.* (1997) suggest that a key socialization factor contributing to boys' literacy underachievement compared with girls is their relative **reluctance to read**. Bray *et al.* (1997) identify the increasing prevalence of video and computer use by boys as being particularly erosive to boys' propensity to read, and note that there are major differences between adolescent girls and boys in their patterns and quality of interpersonal communication among their peers. That is, girls are more likely to have social lives that revolve around verbal discussion and communication, whereas at this developmental stage boys were more likely to have socialization experiences that revolve around play. In commenting on these phenomena, MacDonald *et al.* (1999, p. 15) record:

> The increasing use of solitary computer games, more favoured by boys than girls, can only exacerbate these differences. Patterns of behaviour outside school could either contribute to girls' greater ease with language, or be a reflection of it.
>
> Whatever the case, "large numbers of boys can be said to fall into the category of 'underachieving readers', in the sense that they can decode print but cannot read in a sustained and flexible way, using a variety of contextual clues to extract meaning in the fullest possible sense.

This underachievement by boys and inability to 'cope' with the operational literacy demands of school curricular and assessment, we suggest, are frequently manifested in boys' 'acting-out' behaviors, chronic inattentiveness and disinterestedness, low self-esteem and disengagement or withdrawal from willing participation in schooling. However, the good news arising from findings based on fitting multilevel, non-recursive structural equation models to relevant data (see Rowe & Hill, 1998; Rowe & Rowe, 1992b, 1997b, 1998, 1999, 2000c,d) is that while students' inattentive behaviors have negative effects on their literacy progress, it is literacy achievement that more strongly reduces inattentive behaviors, and provides crucial evidence for improving both educational and behavioral outcomes of students– especially those for boys

We have commented elsewhere (Rowe & Rowe, 2000c) that among the reasons for higher incidence of problem behaviors among boys in the middle and later years of schooling is that they frequently express feelings of alienation from a school curriculum that has become increasingly 'contextualized', and (in their words) "feminized". In interviews, for example, boys frequently express disenchantment about their academic progress, particularly in ***literacy*** and following the transition from primary to secondary schooling. This is especially evident in coeducational secondary schools where, for example, a Year 9 boy claimed recently:

> I'm a second class citizen here; the girls get all the positive vibes from teachers because they talk and write better.

To compensate for this, many such boys place a premium on success in sport and some of the more macho (and often delinquent) activities that yield positive feedback from their peers, rather than recognition from school staff – most of whom (the boys note) are women.

Implications

There are two major implications arising from the evidence summarized above that warrant emphasis here. These are:

1. At the outset, it should be stressed that the demand for enhanced operational literacy and related verbal reasoning and written communication skills by students throughout their

schooling is consistent with that required for functional and effective participation in a postmodern, 'information-rich' society. Given this, it is vital that curriculum planners, designers and teachers do **not** 'dumb-down' the curriculum or its assessment to meet the differential needs of boys – or indeed, any other sub-group of students. Rather, with consideration given to the particular interests and needs of such student sub-groups in an overcrowded curriculum (Hill, Hurworth & Rowe, 1999), **the provision of quality teaching and learning in *literacy*, supported by on-going teacher professional development, must be given the highest priority**.

2. Of crucial importance is the need to maximize the literacy skills of ALL students (boys **and** girls) **as early as possible**, since what should be an **education issue** will become a major **health issue** – even more than is currently the case. The ever increasing number of anxious parents seeking help from pediatricians and other health professionals for their distressed children whose learning difficulties and behavior problems have arisen as a consequence of (or are exacerbated by) failure to acquire literacy skills is, we contend, a **massive problem** (Rowe & Rowe, 1997b, 1988, 1999, 2000). Since 'prevention' has always been more cost-effective than 'cure', governments and their school systems will stand condemned for their neglect if they merely provide 'ambulance services' at the bottom of the 'cliff' when they should have first built a 'fence' at the top.

In any event, issues related to the formulation and implementation of strategies to ensure that **all** students maximize their **literacy learning** potential require urgent attention – especially for boys. Drawing on the work of Teese (2000), Milburn (2000) refers to "...chronic illiteracy is a shameful and damaging secret" and writes: "In the outer west of Melbourne more than 40 per cent of boys and more than 20 per cent of girls fail VCE English" (p. 4). In response, we reiterate the following from Rowe and Rowe (1999, pp. 78-79):

> It is now well established that strategically-designed initial teacher training and subsequent professional development programs in both early and later literacy teaching and learning have major positive impacts on both teacher competence and student performance. In particular, unequivocal evidence from research related to the efficacy of Professor Marie Clay's ***Reading Recovery*** intervention program (Clay, 1993a,b) points to its efficiency and effectiveness in relocating students identified as being "at risk" (mostly boys) on a positive growth trajectory that is sustained (Askew & Frazier, 1997; Lyons, 1997; Rowe, 1995). Moreover, the use of similar methods by teachers in whole-class settings has been demonstrated to have profound 'value-added' effects on students' learning outcomes (Crévola & Hill, 1997, 1998a; Hill & Crévola, 1997), as well as significantly reducing both the salience and incidence of inattentive and disruptive behaviors in the classroom (Hill *et al.*, 1996a; Rowe, 1997a; Rowe & Rowe, 1992b, 1997c, 1998).
>
> Further evidence from this research strongly supports the benefits of strategic approaches to: (1) early identification and intervention for "at risk" students, (2) on-going teacher professional development, and (3) a relentless commitment by the whole school community, including the direct involvement and participation of parents, to ensure that success for **all** students becomes a reality. Above all, this evidence suggests that unless resources are directed at targeted professional development (PD) programs for teachers, the "literacy priority" that is central to current efforts directed towards the restructuring of schooling – and loudly espoused by national governments throughout the world – will remain as mere rhetoric. Moreover, it is our contention that unless the content of this PD is informed by sound empirical research from cognitive and behavioral science, and transcends the crippling ideological partisanship that has for too-long been endemic to teacher education in literacy (see: Singer & Ruddell, 1985; Stahl, 1992; Stahl & Miller, 1989), such PD will be a waste of time.
>
> That is, if we are genuinely serious about improving students' literacy achievements and their attentive behaviors in the classroom, it is vital that PD support strategies be provided to assist teachers in maximizing their own 'efficacy' and student learning – especially those that are firmly grounded in research evidence. **If we are not serious, what should be an education issue will become a major health issue – even more than is currently the case**. The ever increasing number of anxious parents seeking help from pediatricians and psychologists for their distressed children whose behavior problems have arisen as a consequence of (or are exacerbated by) learning difficulties and failure to acquire literacy skills, is a massive problem (Barkley,

1995; Lyons, 1997; Rowe & Rowe, 1997c, 1998). In highlighting issues related to "future directions" for ADHD research and intervention policies, Farrelly and Standish (1996, p. 81) note: "**The impact on mental health and educational systems needs to be examined.**"

Fortunately, at least one Australian State government has recently recognized this problem (NSW, 1997, p. 1) – expressed in the following terms:

> Improved literacy levels have the potential to increase students' self-esteem and their achievement in all key learning areas, and to contribute to the ***reduction of behavioral problems*** that impede the learning of individual students and disrupt the learning of others. ... Sound literacy development in the early years is essential for students' future success in schooling and lifelong learning. ***Literacy development remains a priority for all students as they progress through the grades*** (their emphasis).

In advocating that priority be given to a "whole-school focus on literacy improvement", this government document (NSW, 1997, p. 19) emphasizes the crucial need for: (1) "professional development on literacy teaching practice", (2) the importance of establishing and maintaining "effective partnerships between teachers, parents and students", and (3) the implementation of "appropriate intervention strategies" that "***recognize the links between poor literacy skills and inappropriate behavior or poor attendance***..."

Further, an edited extract from Rowe and Rowe (1999, p. 92) reads:

> A central aim of educational systems is to generate, stimulate and maintain efforts towards the on-going improvement of teaching and learning practices that link directly to the quality of educational outcomes for students (see Hill, 1997a,b,c; Crévola & Hill, 1998b). In our view, such improvements are not likely to be brought about by academic polemic, nor by the 'top-down-driven' administrative fiats of bureaucracies, since the products of these enterprises (mercifully, in most cases) have an established record of rarely penetrating the classroom door. **Rather, with the 'informed' support of parents and health professionals, sustained improvement can be achieved via teacher professional development that maximizes their teaching and behavioral management skills in the classroom.** It has been our experience that under such circumstances, teachers themselves become the empowered agents and purveyors of change, having consequent 'domino' effects on the teaching and classroom behavioral management practices of other teachers, and throughout the profession. Ultimately, of course, the measures of success or otherwise of such efforts, like all endeavors to improve the quality of school education, will be judged in terms of their impact on the key areas of improved student learning, behavior, and the enhancement of teacher professionalism.
>
> For what is demonstratively the most salient and problematic issue in child and adolescent mental health, the challenge into the 'new millenium' is to refocus the prevailing models accounting for the overlap between inattentive behavior problems and poor academic achievement – together with their related intervention emphases – to **educational ones**. In our view, the personal, social and financial costs of failure to meet this challenge will be both unsustainable and unbearable.

Identifying the major sources of variation in students' achievements

It is now well documented that studies of *educational effectiveness* in terms of estimating the effects of schooling on student learning over time "...share two key features: the fact that student growth is the object of inquiry, and the fact that such growth occurs in organizational settings" (Raudenbush & Bryk, 1988, p. 424). Raudenbush and Bryk go on to note that these features correspond, in turn, to two of the most troublesome and enduring methodological problems in educational research, namely: (1) the problem of measuring change, and (2) the problem of analyzing multilevel data. In the preface to their edited collection of related research papers, Raudenbush and Willms (1991, p. xi) observed:

> An irony in the history of quantitative studies of schooling has been the failure of researchers' analytic models to reflect adequately the social organization of life in classrooms and schools. The experiences that children share within school settings and the effects of these experiences on their development might be seen as the basic material of educational research; yet until recently, few studies have explicitly taken account of the effects of particular classrooms and schools in which students and teachers share membership.

Unfortunately, relatively few studies have been undertaken that have accounted for the inherent nested or multilevel organizational structure of schooling with students grouped into classes and taught by particular teachers, despite mounting evidence for the importance of instructional effects at the class/teacher-level (Hill *et al.*, 1996; Hill & Rowe, 1996, 1998; Schaffer, Nesselrodt, & Stringfield, 1994; Scheerens & Bosker, 1997; Rowe & Hill, 1998; Rowe & Rowe, 1999; Teddlie, 1994). Indeed, a powerful conclusion arising from this research is that much of the between-school variation in students' achievements is in fact due to variation among classes. That is, when the organization of students in classes is taken into account, the unique variation due to differences between schools over and above that due to class/teacher-differences is very small indeed. This conclusion is exemplified in a comprehensive review of research into education production functions by Professor David Monk (1992), who cited a number of studies in support of the observation that:

> One of the recurring and most compelling findings within the corpus of production function research is the demonstration that how much a student learns depends on the identity of the classroom to which that student is assigned (p. 320).

One of the more significant studies to provide evidence regarding the importance of class/teacher effects was that of Scheerens *et al.* (1989). This study presented findings from a secondary analysis of data from the Second International Mathematics Study (SIMS). The findings, as summarized in Table 1, indicated that for eight of the nine countries for which between-class/teacher information was available, estimates of the proportion of variance in students' achievements due to class/teacher effects in several countries exceeded 40%, while school effects were significantly smaller, ranging between 0-9%.

Table 1. Comparison of Class/Teacher- and School-Level Effects in Eight Countries*
(Secondary Mathematics scores adjusted for father's occupation)

Country	Class/Teacher Effects (%)	School Effects (%)
Canada	17	9
Finland	45	0
France	16	6
Israel	21	8
New Zealand	42	0
Scotland	31	5
Sweden	45	0
USA	45	9

* Source: Scheerens *et al.* (1989), p. 794

In reviewing this study and related research, Reynolds and Packer (1992, p. 173) observed:

> On the causes of school effects, it seems that early beliefs that school influences were distinct from teacher or classroom influences were misplaced, since a large number of studies utilizing multi-level modeling show that the great majority of variation between schools is in fact due to classroom variation and that the unique variance due to the influence of the school, and not the classroom, shrinks to very small levels.

Similarly, Scheerens (1993, p. 20) noted:

> ...teacher and classroom variables account for more of the variance in pupil achievement than school variables. Also, in general, more powerful classroom level variables are found that account for between-class variance than school level variables in accounting for between-school variance.

Further, based on multilevel analyses of students' results on the Year 10 *General Certificate of School Education* (GCSE) and final year *A-levels* assessments in the United Kingdom, Tymms (1993, pp. 292-293) noted:

> In every case (subjects) more variance was accounted for by the departmental level (than between schools), and the proportion of variance accounted for at the *class level* was more than for the departmental level. A general principle emerges from data such as these and that is that the smaller the unit of analysis and the closer one gets to the pupil's experience of education, the greater the proportion of variance explicable by that unit. In accountability terms the models indicate that ***teachers have the greatest influence*** (my emphasis).

Findings from the *Victorian Quality Schools Project* (VQSP) have confirmed this phenomenon (see Hill & Rowe, 1996, 1998; Hill *et al.*, 1996a; Rowe & Hill, 1998; Rowe *et al.*, 1993; Rowe & Rowe, 1999). When the variance in student achievement data for English and mathematics were analyzed by taking into account the organization of students within classes within schools, estimates of the proportion of residual variance due to school and class/teacher differences were obtained, as summarized in Table 2. The residual variation at the class/teacher-level ranged from 38-45% for English and 53-55% for mathematics, whereas school effects *over and above* those due to differences at the class/teacher-level shrank to 4-9%. This is not to say that differences among schools were not substantial in terms of their effectiveness, but rather that these differences were largely accounted for by internal within-school variation among classes and teachers.

Table 2. Proportional Class/Teacher and School Effects for Victorian Schools: Achievement Adjusted for Prior Achievement

(13,700 students in 90 primary and secondary schools)

		Class/Teacher Effects (%)	School Effects (%)
English			
	Primary	45.4	8.6
	Secondary	37.8	7.4
Mathematics			
	Primary	54.7	4.1
	Secondary	52.7	8.4

The findings summarized in Table 2 – of large class/teacher effects and small to insignificant school effects, we suggest – are primarily a reflection of variations in ***teaching quality***, and point to the conclusion that it is primarily through the ***quality of teaching*** that 'effective' schools make a difference. In an early paper reporting these results from the VQSP, Rowe, Holmes-Smith and Hill (1993, p. 15) suggested that: "...on the basis of our findings to date it could be argued that effective schools are only *effective* to the extent that they have *effective teachers*" (p. 15).

In this context, the work of John Edwards provides poignant insights into the negative effects of *ineffective* teaching and learning practices by highlighting the typical "teacher-talk-dominated" classroom experiences of many students who are differentially attentive in what he calls "the sea of blah" (Edwards, 2000, pp. 4-5):

> The teacher stands at the front of the room and blahs all over the place – blah, blah, blah, blah, blah. The sea of blah fills the room and the students bob up and down in this sea. Every now and again they go under and take a gulp then bob up again for air, and then down again. The gulps are somewhat random. So **students spend their days gulping from the sea of blah** (his emphasis).

> For every one delivered lesson or lecture using the *sea of blah* technique, **each listener takes home a different lesson** (his emphasis). The reason is that when you come back from your mental tangent, all that I have been saying has gone. You can't press rewind on John Edwards, and then press play and out it comes. This is where books and computers have a great advantage over us as information givers. The best analogy I can give you is to imagine you are reading your favorite novel, you go off on a mental tangent, when you come back half of the page has just vanished. Imagine the frustration. That is what *sea of blah* learning is like for the listeners. Yet teacher talk is almost certainly the major mode of instruction still in schools (see, for example, Goodlad, 1984) and universities across the world, even though we all know better.

Even more compelling evidence for the influence of class/teacher-effects on students' achievements derive from the *VCE Data Project* (Rowe, 2000f; Rowe, Turner & Lane, 1999, 2000). This population study of 270,000 Year 12 students' achievements on 53 subjects over a 6-year period (1994-1999) has yielded several findings of interest. Whereas there were strong gender effects in favor of girls (~ + 0.3 standard deviation units), as well as gender/class/school-grouping effects in favor of single-sex classes/schools (see Figure 1), **the magnitudes of these gender-related effects on students' achievements paled into insignificance compared with class/teacher effects**. After adjusting for measures of students' 'abilities', gender and school sector (government, Catholic and independent), class/teacher effects consistently accounted for an average 59% of the residual variance in students' achievement outcomes, compared with a mere 5.5% at the school-level.

That is, there was significantly more variation *within-schools* than *between-schools*, indicating that the quality of teaching and learning provision was by far the most salient factor accounting for variation in students' achievements at Year 12. Above all, such findings serve to emphasize that it is at the level of the classroom that learning takes place and that there can be very substantial differences in the progress made by students in different classes within the same school. Indeed, **teachers make a difference – regardless of student gender, intake or other background characteristics!**

In summarizing key findings from a literature review of research related to boys' achievement progress, motivation and participation at school, MacDonald *et al.* (1999, p. 17) draw a similar conclusion in the following terms:

> The role of the teacher was particularly highlighted in influencing boys' propensity to read as well as their choice of reading. Teachers' attitudes more generally may diminish or increase the problem of underachievement. The role of the teacher is crucial in helping pupils develop a positive attitude to learning.

Barriers to reform

There continues to be several barriers to reform that in our view generate misinformed and misdirected rationalizations of students' differential educational outcomes. Perhaps the most notable of these is a persistent tendency to place undue credence on various outmoded forms of *biological* and *social determinism* which assume that individual children – whether they be boys or girls – do poorly or well at school because of developmental differences, because they are 'dumb' or 'smart' or come from 'disadvantaged' or 'advantaged' backgrounds. Sadly, the longstanding and widespread acceptance of these assumptions at the teacher, school and system levels amount to little more than avoidance 'cop-outs' that have little substantive justification in the emerging research-based evidence (see Crévola & Hill, 1998; Hill & Crévola, 1999; Hill & Rowe, 1996, 1998; Rowe & Hill, 1998; Rowe & Rowe, 1999; Slavin, 1996). As Slavin and colleagues' evaluations of the "Success for All" program among low SES schools in Balitmore and Philadelphia have shown, students who, regardless of their gender, socioeconomic or ethnic backgrounds, are taught by well-trained, strategically focussed, energetic and enthusiastic teachers, are fortunate indeed (see Slavin, 1996; Slavin *et al.*, 1994, 1997).

In contrast to mainstream ideologically-driven *opinion* (eg., Collins *et al.*, 2000; Teese, 2000), the empirical evidence suggests that the proportion of variation in students' achievement progress due to differences in student background and ability (~ 9-15%) is considerably less

important than variation associated with class/teacher membership (~ 30-60%). Rather, the key message to be gained from the school effectiveness research cited above, is that schools and especially **teachers and their professional development *do* make a difference**, and that it is not so much what students bring with them but what they experience on a day-to-day basis in interaction with teachers and other students in classrooms that really matters. While it may be difficult to legislate *quality teaching* into existence, the fact that teachers and schools make a difference (as summarized above) should provide impetus and encouragement to those concerned with the crucial issues of *educational effectiveness* to at least invest in quality teacher recruitment and their on-going professional development.[4]

Another barrier to reform is the persistent tendency for National and Statewide curricula to treat learning as continuous and cumulative rather than recognizing the different *interest* and *learning needs* of students – especially during the 'middle' years of schooling (i.e., Years 5-10) – for both girls and boys. In this regard, MacDonald *et al.* (1999) argue: "Too many strategies are put in place based on untested assumptions about what boys think, do and feel" (p. 17). This has lead to a plethora of popular literature – replete with lists of largely untested *intervention techniques* for dealing with the claimed educational *interests* and *needs* of boys (eg., Alloway & Gilbert, 1997a,b; Frater, 1997). Whereas some of these techniques **may** be helpful, their evidential status in terms of 'effect' is often little more than aspirational.

Clearly, research into educational effectiveness cannot be reduced to simple 'blueprints' or 'recipes' for improvement such as 'check-lists' of strategies for enhancing the achievement progress of boys. Nevertheless, there are some powerful messages for policy-makers, school administrators and teachers seeking dramatic improvements in learning outcomes for both boys and girls. Foremost among those messages is that there are strong empirical grounds for believing that schools and teachers can and *do* make a difference and that consistent high-quality classroom teaching, supported by on-going teacher professional development, *can* and *does* deliver dramatic improvements in student learning (Crévola & Hill, 1998; Rowe, 1997; Rowe & Hill, 1998; Rowe, Pollard, Tan & Rowe, 2000; Rowe & Rowe, 1999; Rowe & Rowe, 2000b). Indeed, the key message from Richard Fletcher (Director of the *Men and Boys Program, Family Action Centre* at the University of Newcastle) is: "We are after good teaching that builds resilience and purpose" (Fletcher, 2000, p. 2).

Another important message relates to the power of information about *educational effectiveness* as a catalyst for improvement and reform. All too frequently systems, schools and teachers have lacked credible information regarding the magnitude of their relative contributions to performance and effectiveness. Fortunately, this is changing (see Hill, 1995, 1998). The trend now is towards the development of indicator systems that facilitate benchmarking of performance against external standards or reference points (eg., ACT, 2000b; Hill & Crévola, 1999; Masters, Forster & Rowe, 2000; Victoria, 1999). At this stage, however, most of this effort is focused on the *measurement* of students' achievements rather than on identifying *sources* of variation and estimating the *magnitudes* of key factors that ***explain*** variation. Indeed, the evidence from systems that have put in place indicator systems and more especially those that have begun to collect and use measures to ***explain*** variation in students' measured outcomes, is that such information is a powerful stimulant to strategic policy and practice interventions that lead to improvement (Coe & Visscher, 2000; Rowe, Turner & Lane, 2000). Sadly, little if any use of 'value-added' measures of effectiveness occurs outside research projects, and there is notable reluctance by some within the profession to countenance any systematic collection of comprehensive data on student achievement and factors affecting achievement. Nevertheless, with increasing recognition of the power of information to motivate and shape improvement efforts, this situation is changing rapidly.

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[4] In their longitudinal study, Hill *et al.* (1996a) showed strong direct effects (>+0.4 standard deviations) of teacher participation in literacy in-service, professional development programs on students' *progress in literacy*. By any criterion, these are large effects.

A further barrier to reform relates to a key reason why so many improvement initiatives in education fail to live up to initial expectations. Hill (1995, 1998) observes that most reforms in education are directed at the *preconditions* for learning rather than at influencing *teaching* and *learning* behaviors within the classroom. For example, many schools see the 'middle years problem' of schooling, or the 'education of boys' as a *structural* one, leading to the establishment of *middle schools, P-12 colleges*, special *transition* programs, and *single-sex classes/schools* (Rowe, 2000b). With the possible exception of the differential effects of specific gender/class/school groupings (see Figure 1), research-based evidence indicates that such structural interventions are *preconditions*, and their effects on learning *per se* are, at best, small to negligible.[5] By contrast, effective improvement initiatives such as **strategic teacher PD** (see Crévola & Hill, 1998; Hill *et al.*, 1996a; Rowe, 1997; Slavin, 1996) are concerned not just with establishing *preconditions*, but with making teaching and learning more effective. They typify attempts to make strong connections between knowledge about school and teacher effectiveness and the design of effective improvement programs and initiatives aimed at the enhancement of student achievement progress – especially in ***literacy*** and the related skills of ***verbal reasoning*** and ***written communication***.

Similarly, while it may be desirable that schools have flexibility in the ways they utilize resources at the school level, including flexibility in the use of staffing resources, improvements in student learning is not a guaranteed outcome of providing such flexibility. This will only occur if the *preconditions* for learning (eg., on-going teacher PD) are then used to change the ways in which students are taught and learn in and outside the classroom. Many reforms stop short of changing what happens beyond the classroom door and thus fail to deliver improved teaching and learning outcomes for teachers and students, respectively. Rather, **real reform calls for substantial change in *teaching and learning strategies***, but unless there is total commitment of all staff to new ways of working, reform efforts soon falter.

Suggested strategies for supporting the learning needs of boys

The fact that teacher-factors have strong positive effects on students' attitudes, behaviors in the classroom and achievement outcomes is of vital importance, with profound implications – for the education of both boys and girls. At the very basis of the notion of *educational effectiveness*, operational ***literacy***, ***verbal reasoning*** and ***written communication skills*** are crucial, and need to be emphasized as keys to improving the achievements and experiences of boys throughout their primary and secondary schooling. To this end, we concur with MacDonald *et al.* (1999, pp. 18-19) in outlining the following as being effective strategies that support the learning needs of boys:

- Focus on **support for literacy** across the curriculum, and **especially PD for teachers**;
- Early diagnosis and intervention for those 'at-risk' of literacy underachievement;
- Highly structured instruction and lessons, with an emphasis on challenge and frequent changes of activity;

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[5] Understandings are emerging from the research evidence suggesting that co-educational settings are limited in their capacity to accommodate the large differences in cognitive, social and developmental growth rates of girls and boys – especially between the ages of 12 and 16 (see Lee & Bryk, 1986; Rowe, 1988; Rowe, Turner & Lane, 1999, 2000; Woodward, Fergusson & Horwood, 1999). Despite some strong *opinions* to the contrary (eg., Robinson & Smithers, 1999), this evidence suggests that during these key adolescent years, single-sex settings better accommodate the specific developmental needs and interests of students (Rowe, 2000g; Watterston *et al.*, 2000). However, it is vital that this evidence is placed in perspective. As noted above, if it is over-interpreted we miss seeing where the major effects lie. That is, the magnitude of effects due to specific gender-groupings for schooling pale into insignificance compared with the effects of quality teaching and learning experiences in the classroom that account for up to 59% of the residual variance in students' achievement outcomes – regardless of any *structural preconditions* for learning that might be imposed, including the establishment of specific gender/class/school groupings of students. In other words, **teachers make the difference, not the gender composition of classes or schools!**

- Greater emphasis on teacher-directed work in the classroom in preference to 'group' work;
- Clear objectives and detailed but simple instructions; provide explicit criteria for presentation of work;
- Short-term, challenging tasks and targets with frequent changes of activity;
- Establishment of assessment and monitoring systems designed to identify under-achievement in key skills across the curriculum, as well as in individual subjects;
- Regular personal interviews for the purposes of target-setting;
- Positive reinforcement: immediate and credible awards for quality work, increased effort and/or improved behavior;
- Providing opportunities for extra tuition/revision;
- Planned program of differentiated personal and social development; and
- Meaningful work experience placement aimed at informing students about changing roles in adult and working life.

References

ACT (2000a). *Against League Tables: Reporting and partnerships in learning.* Watson, ACT: Australian Capital Territory Council of Parents & Citizens Associations Inc. [ISBN 0958714037]

ACT (2000b). *ACT Government School Education Literacy and Numeracy: Performance report* 1999. Tuggeranong, ACT: ACT Department of Education and Community Services [ISBN 0 642 70496-1]

Ainley, J. (1999). *Outcomes and funding in the Commonwealth Literacy and Numeracy Programme.* Report for DETYA. Camberwell, Vic: Australian Council for Educational Research.

Alloway, N., & Gilbert, P. (Eds) (1997a). *Boys and literacy: Teaching units.* Carlton, Vic: Curriculum Corporation.

Alloway, N., & Gilbert, P. (Eds) (1997b). *Boys and literacy: Professional development units.* Carlton, Vic: Curriculum Corporation.

Arnold, R. (1997). *Raising levels of achievement in boys.* Slough, UK: Natio nal Foundation for Educational Research.

Arnot, M., Gray, J., James, M., Rudduck, J., & Duveen, G. (1998). *Recent research on gender and educational performance.* (OfSTED Reviews of Research Series). London: The Stationery Office.

Askew, B.J., & Frasier, D.F. (1997). Sustained effects of Reading Recovery intervention on the cognitive behaviors of second grade children and their perceptions of their teachers. In S.L. Swartz & A.F. Klein (Eds.), *Research in Reading Recovery* (pp. 18-38). Portsmouth, NH: Heinemann.

Barkley, R.A (1996). Attention deficit hyperactivity disorder. In E.J. Mash & R.A. Barkley (Eds.), *Child psychopathology.* New York: Guilford.

Bleach, K. (Ed.) (1998). *Raising boys' achievement in schools.* Stoke-on-Trent: Trentham Books.

Bray, R., Gardner, C., & Parsons, N. (1997). *Can boys do better?* Leicester: Secondary Heads Association.

Browne, R., & Fletcher, R. (Eds.) (1995). *Boys in schools: Addressing the real issues – behaviour, values and relationships.* Sydney: Finch Publishing

Buckingham, J. (2000). *Boy troubles: Understanding rising suicide, rising crime and rising educational failure.* Policy Document. Sydney: Centre for Independent Studies.

Carvel, J. (1997). 'Girls outclassing boys'. *Gaurdian,* November 26, p. 1.

Cassidy, S. (1999). 'Gender gap widens to a gulf'. *Times Education Supplement, 4309,* 19 January, p. 6.

Coe, R., & Visscher, A. (2000) (Eds.). *School improvement through performance feedback.* Lisse, The Netherlands: Swetz & Zeitlinger.

Collins, C., Batten, M., Ainley, J., & Getty, C. (1996). *Gender and school education: A project funded by the Commonwealth Department of Employment, Education, Training and Youth Affairs.* Australian Council for Educational Research [ISBN 0 644 47307 X].

Collins, C., Kenway, J., & McLeod, J. (2000). *Factors influencing the educational performance of males and females in school and their initial destinations after leaving school.* Canberra, ACT: Commonwealth Department of Education, Training and Youth Affairs [ISBN 0 643 448795].

Crévola, C.A., & Hill, P.W. (1998). Evaluation of a whole-school approach to prevention and intervention in early literacy. *Journal of Education for Students Placed at Risk, 3*, 133-157.

Dean, C. (1998). 'Failing boys "public burden number one"'. *Times Education Supplement, 4300*, 27 November, p. 1.

DETYA (2000). *The education of boys: Submission to the House of Representatives Standing Committee on Education, Employment and Workplace Relations.* Canberra, ACT: Analysis and Equity Branch, Department of Education, Training and Youth Affairs: http://www.aph.gov.au/house/committee/ecewr/Eofb/subs/sub117.pdf

Edwards, J. (2000). *The research and realities of teaching and learning in the middle years of schooling.* Keynote address presented at the Middle Years of Schooling Conference. Melbourne Convention Centre, August 14-16, 2000.

Elly, W.B. (1992). *How in the world do students read?: IEA Study of Reading Literacy.* The Hague: The International Association for the Evaluation of Educational Achievement.

Epstein, D., Elwood, J., Hey, V., & Maw, J. (Eds.) (1998). *Failing boys? Issues in gender and achievement.* Buckingham: Open University Press.

Fletcher, R. (2000). Teaching for resilience and purpose in our boys. *Conference Handbook: Teaching boys Developing Fine Men Conference.* Callaghan, NSW: Men and Boys Program, Family Action Centre, University of Newcastle (pp. 2-3).

Fletcher, R., Hartman, D., & Browne, R. (Eds.) (1999). *Leadership in boys education: 16 case studies from public and private, rural and urban, primary and secondary schools.* The University of Newcastle

Frater, G. (1997). *Improving boys' literacy: A survey of effective practice in secondary schools.* London: The Basic Skills Agency.

Irvine, J.F. (1992). *Coping with school.* Sydney: Simon & Schuster.

Irvine, J.F. (1999). *Thriving at school.* Sydney: Simon & Schuster.

Gallagher, A.M. (1997). *Educational achievement and gender: A review of research evidence on the apparent underachievement of boys.* DENI Research Report No. 6. Bangor: DENI.

Goodlad, J. (1984). *A place called school: Prospects for the future.* New York: McGraw-Hill.

Hill, P.W. (1995). *School effectiveness and improvement: Present realities and future possibilities.* Inaugural Professorial Lecture, Faculty of Education, The University of Melbourne.

Hill, P.W. (1998). Shaking the foundations: Research-driven school reform. *School Effectiveness and School Improvement, 9*, 419-436.

Hill, P.W., & Crévola, C.A.M. (1997). The literacy challenge in Australian primary schools. *IARTV Seminar Series, No. 69*, November, 1997.

Hill, P.W., & Crévola, C.A. (1999). The role of standards in educational reform for the 21st century. In D.D. Marsh (Ed.), *ASCD Year Book 1999: Preparing our schools for the 21st century* (pp. 117-142). Alexandria, VA: Association for Supervision and Curriculum Development.

Hill, P.W., Brown, T., Rowe, K.J., & Turner, R. (1997). Establishing comparability of Year 12 school-based assessments. *Australian Journal of Education, 41*, 27-47.

Hill, P.W., Hurworth, R., & Rowe, K.J. (1999). *The place of literacy and numeracy in the primary school curriculum: A national survey.* Canberra, ACT: Department of Education, Training and Youth Affairs (ISBN 0 646 3172 X).

Hill, P.W., & Rowe, K.J. (1995). Use of multi-level modeling in procedures for maximizing between-school comparability of final year school-based assessments. *Multilevel Modelling Newsletter 7* (1), 12-16.

Hill, P.W., & Rowe, K.J. (1996). Multilevel modeling in school effectiveness research. *School Effectiveness and School Improvement, 7* (1), 1-34.

Hill, P.W., & Rowe, K.J. (1998). Modeling student progress in studies of educational effectiveness. *School Effectiveness and School Improvement, 9* (3), 310-333.

Hill, P.W., Rowe, K.J., Holmes-Smith, P., & Russell, V.J. (1996a). *The Victorian Quality Schools Project: A study of school and teacher effectiveness.* Report to the Australian Research Council (Volume 1 – Report). Centre for Applied Educational Research, Faculty of Education, The University of Melbourne.

Hill, P.W., Rowe, K.J., Holmes-Smith, P., & Russell, V.J. (1996b). *The Victorian Quality Schools Project: A study of school and teacher effectiveness.* Report to the Australian Research Council (Volume 2 – Appendices). Centre for Applied Educational Research, Faculty of Education, The University of Melbourne.

Hinshaw, S.P. (1992a). Academic underachievement, attention deficits and aggression: Comorbidity and implications for intervention. *Journal of Consulting and Clinical Psychology, 60*, 893-903.

Hinshaw, S.P. (1992b). Externalizing behavior problems and academic under-achievement in childhood and adolescence: Causal relationships and underlying mechanisms. *Psychological Bulletin, 111*, 127-155.

Hinshaw, S.P. (1994). *Attention deficits and hyperactivity in children.* Developmental Clinical Psychology and Psychiatry Series, Volume 29. London: Sage.

Lee, V.E., & Bryk, A.S. (1986). Effects of single-sex secondary schools on student achievement and attitudes. *Journal of Educational Psychology, 78*, 381-395.

Lunberg, I., & Linnakylä, P. (1993). *Teaching reading around the world: IEA study of reading literacy.* The Haugue: The International Association for the Evaluation of Educational Achievement.

MacCann, R. (1995). *A longitudinal study of sex differences at the Higher School Certificate and School Certificate*: Trends over the last decade. Sydney: New South Wales Board of Studies.

MacDonald, A., Saunders, L., & Benfield, P. (1999). *Boys' achievement progress, motivation and participation: Issues raised by the recent literature.* Slough, UK: National Foundation for Educational Research [ISBN 0 7005 1543 7].

Marks, G., Fleming, N., Long, M., & McMillan, J. (2000). *Patterns of participation in Year 12 and higher education in Australia: An update and examination of some contemporary issues.* Camberwell: The Australian Council for Educational Research.

Masters, G.N., & Forster, M. (1997a). *Literacy standards in Australia.* Canberra, ACT: Commonwealth of Australia.

Masters, G.N., & Forster, M. (1997b). *Mapping literacy achievement: Results of the 1996 National School English Literacy Survey.* A report on behalf of the Management Committee for the National School English Literacy Survey. Canberra, ACT: Department of Employment, Education, Training and Youth Affairs.

McGaw, B. (1996). *Their future: Options for reform of the Higher School Certificate.* Sydney: Department of Training and Education Co-ordination.

McGee, R., & Share, D.L. (1988). Attention deficit disorder-hyperactivity and academic failure: Which comes first and what should be treated? *Journal of the American Academy of Child and Adolescent Psychiatry, 27*:318-325.

McGee, R., Share, D.L., Moffitt, T.E., Williams, S., & Silva, P.A. (1988). Reading disability, behavior problems and juvenile delinquency. In D.H. Saklofske & S.B.G. Eysenck (Eds.), *Individual differences in children and adolescents: International perspectives* (pp. 158-172). London: Hodder & Stoughton.

Milburn, C. (2000). 'Our desperate schools'. *The Age, News Extra*, Saturday, August 5, p 4.

Millard, E. (1997). *Differently literate: Boys, girls and the schooling of literacy.* London: The Flamer Press.

Mitchell, P. (2000). Building capacity for working with boys at risk of depression and suicide. *Conference Handbook: Teaching boys Developing Fine Men Conference.* Callaghan, NSW: Men and Boys Program, Family Action Centre, University of Newcastle (pp. 124-127).

Monk, D.H. (1992). Education productivity research: An update and assessment of its role in education finance reform. *Education Evaluation and Policy Analysis, 14*, 307-332.

NSW (1997). *Literacy 97 strategy – focus on literacy: A position paper on the teaching of literacy.* Sydney: New South Wales Department of School Education.

Purves, A.C. (1973). *Literature education in ten countries: An empirical study.* New York: Wiley.

Raudenbush, S.W., & Bryk, A.S. (1988). Methodological advances in analyzing the effects of schools and classrooms on student learning. In E.Z. Rothkopf (Ed.), *Review of research in education 1988-1989, Vol. 15* (pp. 423-475). Washington, DC: American Educational Research Association.

Raudenbush, S.W., & Willms, J.D. (Eds.). (1991). *Schools, classrooms and pupils: International studies of schooling from a multilevel perspective.* New York: Academic Press.

Reynolds, D., & Packer, A. (1992). School effectiveness and school improvement in the 1990's In, D. Reynolds & P. Cuttance (Eds.), *School effectiveness: Research policy and practice* (pp. 171-187). London: Cassell.

Robinson, P., & Smithers, A. (1999). Should the sexes be separated for secondary education? Comparisons of single-sex and co-educational schools. *Research Papers in Education, 14* (1), 23-49.

BEST COPY AVAILABLE

Rowe, K.J. (1988). Single-sex and mixed-sex classes: The effects of class-type on student achievement, confidence and participation in mathematics. *Australian Journal of Education, 32* (2), 180-202.

Rowe, K.J. (1991). The influence of reading activity at home on students' attitudes towards reading, classroom attentiveness and reading achievement: An application of structural equation modeling. *British Journal of Educational Psychology, 61* (1), 19-35.

Rowe, K.J. (1995). Factors affecting students' progress in reading: Key findings from a longitudinal study. *Literacy, Teaching and Learning, 1* (2), 57-110.

Rowe, K.J. (1996). Assessment, performance indicators, league tables, value-added measures and school effectiveness: Issues and implications. *IARTV Seminar Series*, No. 58, October, 1996.

Rowe, K.J. (1997). Factors affecting students' progress in reading: Key findings from a longitudinal study. In S.L. Swartz & A.F. Klein (Eds.), *Research in Reading Recovery* (pp. 53-101). Portsmouth, NH: Heinemann.

Rowe, K.J. (1998). *What's so good about Reading Recovery?* Invited Keynote address presented at the International Reading Recovery Institute Conference, Cairns, Queensland, Australia, July 5-8, 1998.

Rowe, K.J. (1999a). *Reading Recovery: Research evidence for its positive impact on children's growth towards literacy and behavioral autonomy.* Invited keynote address presented at the National Reading Recovery Tutor Development Conference, Auckland College of Education, Auckland, New Zealand, July 12-16, 1999.

Rowe, K.J. (1999b). *VCE Data Project (1994-1999): Concepts, issues, directions & specifications.* A research and evaluation project conducted for the Board of Studies, Victoria. Centre for Applied Educational Research, The University of Melbourne.

Rowe, K.J. (1999c). *The interdependence of Literacy, numeracy and behavior outcomes of Year 7 students in Tasmanian schools.* A research and evaluation report commissioned by the Office of Educational Review, Department of Education, Tasmania, September, 1999.

Rowe, K.J. (1999d). *Literacy, numeracy and behavior of Grade 3 students in Tasmanian schools.* A research and evaluation report commissioned by the Office of Educational Review, Department of Education, Tasmania, August, 1999.

Rowe, K.J. (2000a). *"I hate school!" Addressing the emergent research evidence about the education and schooling of boys.* Invited keynote-workshop presented at the National Student Welfare Conference 2000, Melbourne Exhibition & Convention Centre, June 1-2, 2000.

Rowe, K.J. (2000b). *Celebrating coeducation? Certainly not for academic achievement! An examination of the emergent research evidence.* Invited keynote address presented at the Second National Conference on Co-education, Kinross Wolaroi School, Orange, New South Wales, April 16-19, 2000.

Rowe, K.J. (2000c). *The impact of Reading Recovery in the context of teacher and school effectiveness.* Invited workshop seminar presented at the Annual Reading Recovery Conference, Melbourne Convention Centre, July 28-29, 2000.

Rowe, K. J. (2000d). Assessment, league tables and school effectiveness: Consider the issues and 'let's get real'! *Journal of Educational Enquiry, 1* (1), 73-98.

Rowe, K.J. (2000e). Educational performance indicators. In M. Forster, G. Masters and K.J. Rowe, *Measuring learning outcomes: Options and challenges in evaluation and performance monitoring* (pp. 2-20). Strategic Choices for Educational Reform; Module IV – Evaluation and Performance Monitoring. Washington, DC: The World Bank Institute.

Rowe, K.J. (2000f). *The VCE Data Project: An information service about student and provider performance on the VCE, across studies and over time.* Invited address presented to a joint meeting of the Board and Assessment Committee, Victorian Board of Studies, March 8, 2000.

Rowe, K.J., & Hill, P.W. (1996). Assessing, recording and reporting students' educational progress: The case for 'Subject Profiles'. *Assessment in Education, 3* (3), 309-352.

Rowe, K.J., & Hill, P.W. (1998). Modeling educational effectiveness in classrooms: The use of multilevel structural equations to model students' progress. *Educational Research and Evaluation, 4* (4), 307-347.

Rowe, K.J., Holmes-Smith, P.D., & Hill, P.W. (1993). *The link between school effectiveness research, policy and school improvement: Strategies and procedures that make a difference.* Paper presented at the 1993 Annual Conference of the Australian Association for Research in Education, Fremantle, W.A., November 22-25, 1993.

Rowe, K.S., Pollard, J., Tan, L., & Rowe, K.J. (2000). *Auditory processing effects on early literacy and behavior: Evidence for the value of auditory screening of children on school entry.* Invited paper-

poster presented at the Second International Conference on Child and Adolescent Mental Health. The Renaissance Hotel, Kuala Lumpur, Malaysia, June 6-10, 2000.

Rowe, K.J., & Rowe, K.S. (1992a). The relationship between inattentiveness in the classroom and reading achievement (Part A): Methodological Issues. *Journal of the American Academy of Child and Adolescent Psychiatry, 31* (2), 349-356.

Rowe, K.J., & Rowe, K.S. (1992b). The relationship between inattentiveness in the classroom and reading achievement (Part B): An Explanatory Study. *Journal of the American Academy of Child and Adolescent Psychiatry, 31* (2), 357-368.

Rowe, K.S., & Rowe, K.J. (1997a). Norms for parental ratings on Conners' Abbreviated Parent-Teacher Questionnaire: Implications for the design of behavioral rating inventories and analyses of data derived from them (Leading article). *Journal of Abnormal Child Psychology, 25* (6), 425-451.

Rowe, K.J., & Rowe, K.S. (1997b). Inattentiveness and literacy achievement: The interdependence of student and class/teacher effects. Paper presented at the 42nd Scientific Meeting of the Australian College of Paediatrics, Christchurch, New Zealand, August, 11-15, 1997. *Journal of Paediatrics and Child Health, 33* (4), A20.

Rowe, K.J., & Rowe, K.S. (1998). *Modeling the overlap between students' attentive-inattentive behaviors in the classroom and their literacy progress.* Monograph of paper/poster presented at the First International Conference on Child & Adolescent Mental Health, The Chinese University of Hong Kong, June 2-6, 1998. Melbourne: Centre for Applied Educational Research and Department of Paediatrics, The University of Melbourne.

Rowe, K.J., & Rowe, K.S. (1999). Investigating the relationship between students' *attentive-inattentive* behaviors in the classroom and their literacy progress. *International Journal of Educational Research, 31* (2), 1-138 (Whole Issue). Elsevier Science, Pergamon Press.

Rowe, K.J., & Rowe, K.S. (2000a). *Inquiry Into the Education of Boys: Submission to the House of Representatives Standing Committee on Employment, Education and Workplace Relations.* Melbourne: MIMEO. This paper is available in *.pdf format on the House of Representatives web site, at: http://www.aph.gov.au/house/committee/eewr/Eofb/subs/sub111.pdf

Rowe, K.S., & Rowe, K.J. (2000b). *Auditory processing effects on early literacy and behavior.* Invited Keynote address presented at the Students with Disabilities Conference, Melbourne Convention Centre, August 1-2, 2000.

Rowe, K.J., & Rowe, K.S. (2000c). "Windy days and red icy-poles": Searching for causes of boys' behaviours in schools. *The Boys in Schools Bulletin, 3* (1), 4-8.

Rowe, K.J., & Rowe, K.S. (2000d). Useful findings from research in literacy and numeracy teaching and learning for boys and girls. *Conference Handbook: Teaching boys Developing Fine Men Conference.* Callaghan, NSW: Men and Boys Program, Family Action Centre, University of Newcastle (pp. 82-92).

Rowe, K.J., Turner, R., & Lane, K. (1999). *The 'myth' of school effectiveness: Locating and estimating the magnitudes of major sources of variation in students' Year 12 achievements within and between schools over five years.* Paper presented at the 1999 AARE-NZARE Joint Conference of the Australian and New Zealand Associations for Research in Education, Melbourne Convention Centre, November 29 – December 2, 1999 (Index Code: ROW99125).

Rowe, K.J., Turner, R., & Lane, K. (1999). *A method for estimating the reliability of assessments that involve combinations of school-assessed tasks and external examinations.* Paper presented at the 1999 AARE-NZARE Joint Conference of the Australian and New Zealand Associations for Research in Education, Melbourne Convention Centre, November 29 – December 2, 1999 (Index code: ROW99126).

Rowe, K.J., Turner, R., & Lane, K. (2000). Performance feedback to schools of students' Year 12 assessments: The *VCE Data Project.* In R. Coe and A. Visscher (Eds.), *School improvement through performance feedback.* Lisse, The Netherlands: Swetz & Zeitlinger.

Schaffer, E.C., Nesselrodt, P.S., & Stringfield, S. (1994). The contribution of classroom observation to school effectiveness research. In D. Reynolds, B.P.M. Creemers, P.S. Nesselrodt, E.C. Schaffer, S. Stringfield & C. Teddlie (Eds.), *Advances in school effectiveness research and practice* (pp. 133-150). Oxford: Pergamon Press.

Scheerens, J. (1993). Basic school effectiveness research: Items for a research agenda. *School Effectiveness and School Improvement, 4* (1), 17-36.

Scheerens, J., & Bosker, R. (1997). *The foundations of educational effectiveness.* Oxford: Pergamon.

Scheerens, J., Vermeulen, C.J.A.J., & Pelgrum, W.J. (1989). Generalizability of instructional and school effectiveness indicators across nations. *International Journal of Educational Research, 13* (7), 789-799.

Slavin, R.E. (1996). *Education for all.* Lisse: Swets & Zeitlinger.

Slavin, R.E., Madden, N.A., Dolan, L.J., Wasik, B.A., Ross, S.M., & Smith, L.J. (1994). Whenever and wherever we choose: The replication of 'Success for All'. *Phi Delta Kappan, 75*, 639-647.

Slavin, R.E., Madden, N.A., Dolan, L.J., Wasik, B.A., Ross, S.M., Smith, L.J., & Dianda, M. (1997). Success for All: A summary of research. *Journal of Education for Students Placed at Risk, 1*, 41-76.

Sukhnandan, L., Lee, B., & Kelleher, S. (2000). *An investigation into gender differences in achievement. Phase 2: School and classroom strategies.* Berkshire: National Foundation for Educational Research [ISBN 0 7005 1551 8].

Teddlie, C. (1994). The integration of classroom and school process data in school effectiveness research. In D. Reynolds, B.P.M. Creemers, P.S. Nesselrodt, E.C. Schaffer, S. Stringfield & C. Teddlie (Eds.), *Advances in school effectiveness research and practice* (pp. 111-132). Oxford: Pergamon Press.

Teese, R. (2000). *Academic success and social power: Examinations and inequality.* Carlton, Vic: Melbourne University Press.

Teese, R., Davies, M., Charlton, M., & Polesel, J. (1995). *Who wins at school? Boys and girls in Australian secondary education.* Melbourne: Department of Education, policy and Management, The University of Melbourne.

Turner, R. (1998). *Using the General Achievement Test to ensure comparability of school assessments in the Victorian Certificate of Education.* Unpublished Master of Science Thesis, Department of Mathematics and Statistics, The University of Melbourne.

Tymms, P. (1993). Accountability – can it be fair? *Oxford Review of Education, 19*, 291-299.

Victoria (1991). *English Profiles Handbook: Assessing and reporting students' progress in English.* Melbourne, Vic: School Programs Division, Ministry of Education and Training.

Victoria (1999). *VCE benchmarks 98.* Melbourne, Vic: Office of Review, Department of Education [ISBN 0 7306 9153 5].

Warrington, M, & Younger, M. (1996). Gender and achievement: The debate at GCSE. *Education Review, 10* (1), 21-27.

Watterston, B., Boyleen, S., & Watterston, J. (2000). Single-sex classes: Do they work for boys and girls? *Conference Handbook: Teaching boys Developing Fine Men Conference.* Callaghan, NSW: Men and Boys Program, Family Action Centre, University of Newcastle (pp. 109-118).

West, P. (1999). Boys' underachievement in school: Some persistent problems and some current research. *Issues in Educational Research, 9* (1), 33-54.

Woodward, L.J., Fergusson, D.M., & Horwood, L.J. (1999). Effects of single-sex coeducational secondary schooling on children's academic achievement. *Australian Journal of Education, 43*, 142-156.

Zubrick, S.R., Silburn. S.R., Gurrin, L.. Teoh, H., Shephard, C., Carltin, J., Lawrence, D. (1997). *Western Australian Child Health Survey: Education health and competence.* Perth, WA: Australian Bureau of Statistics and the TVW Telethon Institute for Child Health Research. [ISBN 0 642 1739 0]